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West Europe Report

SCIENCE AND TECHNOLOGY

(FOUO 6/80)



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WEST EUROPE REPORT
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INTERNATIONAL AFFAIRS

EUROPEANS PIONEER ROBOT WELDING

London FINANCIAL TIMES in English 6 Mar 80 p 11

[Text] FOUR manufacturing centres, two each in Holland and Belgium and belonging to large international groups, are being used successfully as guinea pigs for the large-scale application of robot welding—or flexible automation, as some engineering managers prefer to call it—to routine production problems.

Each centre has adopted a slightly different approach in its adoption of the new technology. But management in all four centres will undoubtedly agree with P. van de Bersselaar at the Zweegers heavy agricultural machinery plant at Geldrop in Holland that: "If you want to stay in the market, you have to get a robot."

His reasons for the move are twofold. It is becoming increasingly difficult to recruit good welders and even harder to keep them on the payroll where, as so often happens, they are required to do boring, repetitive jobs, with a consequent fall in concentration towards the end of a shift.

Bersselaar points out that, provided the user does his homework, he will gain complete control over weld quality and avoid deformation of relatively thin metal sheets. This is particularly important for his company, because it exports its tedders, hay rakes and other equipment all over the world. A breakdown due to a weld failure in the middle of the harvest in, say, New Zealand, would not endear the company to the user, who would be pretty vocal in the surrounding countryside. Hence the robot to work on particularly vital components.

In the company's plant, a trained welder has a choice of three worktables operating with the robot on five welding programs at his discretion—to a large extent.

When the robot itself can be used to carry out preliminary tack-welds on assemblies of parts to be joined, gains in production speeds run from threefold to about 50 per cent. Where manual tack-welding is required, gains are of the order of 50 per cent.

Bersselaar underlines the need to select the man who will run the robot with great care—he must dominate the equipment and ensure that it works without a stop.

At the same time, the programmer who instructs the robot what to do must have more than a mere acquaintance with welding techniques.

Ideals and procedures developed in Geldrop are likely to be extended in the near future to plants in Belgium, Austria and Spain.

At the Tomado factory close to the Belgian border at Zwijndrecht, an equally ambitious robot welding plan has been conceived with the aid of a programming expert who had no previous knowledge of welding technology.

Member of the big Belgian Bekeart goods handling equipment group, Tomado has completely automated the production of a heavy-duty trolley. This is built up from 17 mild-steel parts by 44 short welds in five minutes. These trolleys have to take very rough treatment in the wholesale food and other plants in which they are used.

These stackable trolleys take twice as long to produce by hand-welding. But, just like Geldrop, Zwijndrecht is a very short of welders who are prepared to do demanding repetitive work.

Some 5,000 robot welds are made by the ESAB/ASEA machine in one shift and only 80 of these have to be gone over again as being out of tolerance.

This is due to factors outside the immediate control of the company, but being brought under control as time goes by. Second and possibly third-shift working are under consideration.

Meanwhile, a second and much more complex robot welding operation is in the final stages of commissioning under the control of Mr. R. K. Kühl and his programmer Mr. van Breughel. This uses, exceptionally, the sixth axis capability of the robot to change over from a completed side-frame for the trolley mentioned above to one which the operator has just fixed in a jig ready for welding.

This jig is at an angle to the first and because of the length of the frame unit this demands that the robot move on its own bed-plate to cover all the joints.

Accuracy is not lost, however, and the jigs are designed to tolerances of 0.1mm. Meanwhile, the 2½ minute welding time allowed gives the operator ample opportunity to take out the completed section and place fresh components in the vacated jig.

There will thus be virtually no idle time on this particular installation and the parent company, Bekeart, which is Tomado's world selling organisation, is watching developments with understandable interest.

South of the border, in Zeddegem, near Bruges, Sperry New Holland has approached the problem in a completely different way to the preceding groups in that it has tackled the most difficult job first—on the grounds that once that was out of the way, the rest would be easy.

The workpiece now being produced on a routine basis, is a big mild-steel gearbox for heavy-duty harvesting equipment. It weighs 115 kilos and

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needs a 500 kilo manipulator to present it to the robot at the optimum welding angle.

This gearbox has been made as a routine operation on a production line since last October and the New Holland installation was the first such in Belgium.

Because of Sperry's world-wide management policies, this particular innovation has been subjected to the most searching analysis and has shown a return on capital employed of between 25 and 27 per cent. Actual up-time since work began amounts to 87 per cent with an ultimate target of, say, 90 per cent.

And, as Mr. de Cloedt, director with special responsibility for this production unit says: "weld quality conforms to company standards." This apparently mild statement covers a complete metallurgical analysis of production run welds, once the robot was up and running, to ensure that penetration in a two-sided weld up to 1.4 cm thick was perfect. That it was and is can be gleaned from the fact that no customer, so far, has reported any gearbox leaks.

Less important in considering the human side is the halving of production time from 80 minutes. Much more important is that the robot will put up with ambients of up to 55/60 degrees C when the inside welds of the gearbox are being made.

Highly significant in this particular installation is the close attention paid to it by top U.S. management and not only because experience of robot welding there has been less than satisfactory. In fact, it seems that experience in Zedelghem will be drawn on for perhaps three U.S. plants and other manufacturing operations elsewhere in the Sperry empire.

At Nivelles, centre for the Belgian operations of UOP Bostrom, the aim of flexible automation is very different. Mr. P. Philips, masterminding the robot operation there, wants his robot(s) to be able to make as many different assemblies as possible, for the enormous variety of ergonomic seats the world group makes for heavy duty vehicles—tractors and lorries—from many big manufacturers.

The Nivelles system differs from the foregoing ones in the robot works to a two-

position rotating table. Safety interlocks are so designed that the operator cannot load a jig till the robot has finished rotating the finished workpiece to his position, or the robot is inhibited till the operator is ready.

Many jigs for various seat components have been designed to date and it takes a bare half-hour to install two new jigs on the table and change the welding programme. As a measure of time saved, the new equipment can turn out 100 sets of tractor seat suspension levers in under five hours, against 13 hours by hand.

Because of the many programs and the large number of parts involved, this particular application of robots is having a marked influence on the design procedure. As Philips says, until now, engineers have avoided the need to weld. Now, in his plant, designers are re-drawing components to avoid complex stamping and bending work in favour of welding.

As in the case of the other centres, sharp attention is being focused on the robot from companies in the group but operating outside Belgium. And it has already been decided that the new UOP plant to be set up at Northampton in England at a cost of £9m will have two robot centres based on the Nivelles experience.

Ultimately, these will be carrying out long-run mass-production jobs, while the work on specialist parts will appropriately remain in Nivelles where initial experience was gained.

Interesting in the approach to a manufacturing decision at the Nivelles plant was that Philips started out with the idea that he would go for full automation. Having seen an ESAB/ASEA robot at a German welding exhibition, he became interested, but nevertheless called in tenders from four other contestants—Trallfa (Norway), Kuka (Germany), BOC (UK) and Unimate (UK/U.S.). ESAB won despite the fact that total cost was considerably higher than the final runner-up.

To date, ESAB has sold 140 arc-welding robots worldwide and could sell many more but for the fact that it is not possible yet to mass-produce units such as these that could create enormous production line problems should they go wrong.

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FEDERAL REPUBLIC OF GERMANY

HIGH-PRESSURE WATER JETS FOR PRECISION CUTTING

Hamburg CAPITAL in German Mar 80 p 247

[Article: "Sharp Water, an Alternative to Laser Technology"]

[Text] Jet cutting, a new technology with a future, is causing a stir in the cutting of many materials, including metal and plastic.

For engineers, the new cutting tool is a sensation. Laymen consider it inconceivable: Hair-thin, superfast water jets cut materials of all types, even metal. Impressed, Guetersloh engineer Burghardt Vossen, designer in this new-technology area, describes the effect of the "wet element": "It cuts through a couple of layers of leather like it was butter."

The effect of water jets impacting soil or sand is sufficiently understood by everyone. For many years, industry has used the capability of high-pressure water jets to clean oil from machines, sand from castings and chemicals from laboratory equipment; mining breaks coal with water, highway builders even dig tunnels with hydraulic force.

But only in the past few years has it been known that a water jet ejected from a nozzle under very high pressure at supersonic speed can cut metal foils, plastic sheet, granite, brick, asbestos and wood with great precision. The technology is at such an interesting stage that the Ministry for Research and Technology in Bonn is involved and several German machine-tool companies are quietly eyeing the development of such progressive cutting equipment which, within a few years, could make them market leaders in machine-tool construction.

The hydraulic cutting process presents a serious competitor for laser-beam cutting. The latter is touted as very advanced, but is expensive and somewhat less efficient. The laser beam proves in common practice to be not exactly the universal tool for cutting any and all materials. The laser shares this shortcoming with the electron beam, which was introduced about 15 years ago, and with conventional cutting methods like mechanical shears, rotating cutting tools and cutting torches.

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Of course, even the water cutter cannot cut everything; however, it offers numerous application possibilities. Right now, the technologists are trying it on layered materials, such as sheets of laminated aluminum foil, carpeting, plastics for automotive use, textiles, plywood, glass-fiber reinforced plastic, asbestos-cement sheets, rockwool, leather, rubber, cardboard boxes, sheetrock, paper, styropor and plexiglass.

Even now, not by any stretch of the imagination are all application possibilities known to the experts. Vossen predicts a great future for the water jet as soon as, utilizing extremely high pressure, it can be made to drill or saw through copper, brass, or even steel. These dreamed-of goals of the engineers will be achieved in a few years, when it is possible to produce significantly higher water pressure and to thrust it through jets.

When the English and Russians experimented with high-pressure water jets about 7 years ago, they always brought the pressure up to 2,500 bar (for comparison, coal can be broken with a jet pressure of 750 bar). However, neither the pumps, valves, seals nor, above all, the jets can withstand the forces of the high-pressure water.

Only the further development of extremely hard materials for high-pressure pumps and the use of diamond or sapphire for the jets has given the engineers an opportunity to work in the present neighborhood of 4,200 bar. In this case, the jet impacts the workpiece at a speed of 5,000 km/h with the trajectory of a medium-range ballistic missile.

The technological secret of the jet cutter is its ability to focus energy on a point of less than half a millimeter in diameter. In contrast to other cutting processes, the high-energy density makes it possible, for example, to start the cut in the interior of the workpiece instead of at its edge. Other advantages are that it cuts any desired computer-programmed and controlled line or curve without producing dust, without material clamping tools, with low noise and minimum material loss.

In many cases, jet cutting is superior to the laser. The light column, in contrast to the water jet, is dust sensitive, difficult to guide, can cause fires in the material and cannot cut layered material of nonuniform thickness. Finally, laser equipment is also considerably more expensive. According to Vossen's figures, a laser-cutting machine complete with computer control to be used for cutting single-layered materials costs DM 575,000; a comparable jet-cutting machine, but which can cut up to 16 layers of material, costs DM 425,000 and a conventional mechanical cutting machine, which exhibits about 40 percent higher material loss, costs DM 375,000. An example: A shoe factory in the United States which employed a jet-cutting machine was able to amortize the new installation within just 2 years by the savings in the cutting operation alone.

The quality of cut also contributes significantly to the economics of the system. No burr is left along the cut and expensive dust suction equipment can be eliminated, resulting in considerable energy savings.

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In spite of all cost advantages, purchasing agents in many factories will still have to wait a while before the engineers make the perfect machine available to them. For presently, these high-bred machines, especially when cutting with high pressure, can only be used a few hours at a time--in continuous operation they wear out too fast. The state of the art will be revealed at a jet-cutting conference in April in Hannover by the approximately 200 engineers who, to date, are the only knowledgeable people in the world. Considered as most urgent are improvements in aeronautical and space technology and mining technology--coal mining and tunnel driving--through the application of high-pressure water jets.

In coal breaking, the miners can eliminate an effect which is also important in the jet cutting of paper: The water jet is so fast that it doesn't even wet the paper.

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FEDERAL REPUBLIC OF GERMANY

AUDI TO REDUCE FUEL CONSUMPTION BY HALF

Hamburg CAPITAL in German Apr 80 pp 160-161

[Unattributed article: "Big Pistons -- Audi's Energy Conservation Concept"]

[Text] Within the next 10 years, Ingolstadt's Audi company intends to reduce the fuel consumption of its automobiles by 50 percent. Development chief Ferdinand Piëch also knows how he will do it: in any event, differently than the other auto manufacturers.

"We engineers must adjust to people's natural driving habits and offer the right solution. And that will unfortunately be so unusual that not much will remain of today's cars."

The words of Ferdinand Piëch, chief of development on the board of Audi NSU Auto Union Company in Ingolstadt, may be music to the ears of drivers, but Piëch's colleagues among the other auto makers are more likely to hold with Goethe's Gretchen in "Faust": "Ferdinand, we have dread of thee."

Ferdinand Piëch, 43, has a vision which stamps some designers in the branch as laggards in the field of automobile technology. For Piëch, grandson of the legendary VW designer Ferdinand Porsche, is saying radical things: "To save gasoline, the whole philosophy of the automobile must be changed." And he is also quick to reveal his methods: "Greater piston displacement, lighter cars and top-flight aerodynamics -- all in one package."

It sounds fantastic: While nearly all other auto makers are struggling to supply people with cars with small-volume motors, Piëch is arguing for engines with greater cylinder capacity. Indeed, he considers some of his colleagues to be illusionists. For instance, the idea of being able to save fuel with cylinders that can be switched on and off in one engine seems to Piëch to be "not in tune with the times." Says the man from Audi: "That's a crutch for the makers of large-volume motors. And I don't think it's a good thing to drag the past into the future."

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In fact, the technique of switching off cylinders -- one that diesel motor engineers have been testing for years -- is a controversial engine technology, since even the non-operating but merely companion pistons consume fuel. Moreover, the cylinders cool down, thus leading to problems with lubrication and restarting.

All the same, that would be only a minor problem for Ferdinand Piëch. He prefers not to discuss individual economies; he would rather trim the whole car for more economical operation. Says Piëch: "Piston displacement volume, gear gradation, vehicle weight and aerodynamics -- the precise coordination of all these is what will bring the major move toward economy. I expect that between 1985 and 1990 we'll have cut fuel consumption to half what it is today, and by 1995 down to one-third."

Audi's competitors do indeed hear the glad tidings -- but they have little faith. BMW Bavarian Motor Works development chief Dr Karlheinz Radermacher, for instance, considers Piëch's prediction to be simply wrong.

To be sure, one can hardly deny Piëch's eye for reality even though his concept is only one of many which, in light of the unrelenting rise in gas prices, are designed to accustoming automobiles to lower fuel consumption in the future. Porsche, for example, is developing economical sports cars and is experimenting with engines in which cylinders can not only be switched off but shut off automatically during longer periods of idling, such as at red lights or railroad crossing barriers, and then restarted merely through pressure on the gas pedal.

The Bavarian Motor Works have prepared 1,000 cars so that they will run on a fuel mixture composed of gasoline and 15 percent methanol (alcohol). The Munich auto makers intend to save gas with the aid of electronics: It is to help the combustion process in the engine reach its greatest level of effectiveness. All the manufacturers swear by the economy features of their cars, especially since German producers have "pledged on a voluntary basis" (according to Porsche engineer Wulf Baehr) to cut fuel consumption by 25 percent by 1985.

The motivation behind their agreement on this is not strictly altruistic: The German auto manufacturers want to continue exporting to the United States, but the government there will be requiring within a few years that the average fuel consumption of a manufacturer's auto fleet be less than 10 liters per 100 km. This handicap is forcing everyone to build fuel-efficient cars.

Audi has a few simple formulas for the future. The practical rule of thumb is still that the propulsion of 100 kg of automobile mass also means the consumption of 1 liter of gasoline per 100 km. Piëch plans to improve this empirical value: His engines will in the future use a liter of fuel to carry less automobile a substantially greater distance with a lower

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horsepower rating and reduced wind resistance -- but with the same acceleration and top speed.

The Ingolstadt engineers are starting from the assumption that horsepower considerations are already an anachronism. According to Piëch, increased piston displacement is the dictate of the future, for only greater cylinder volume will permit a car to operate with a lower number of revolutions, thus permitting incorporation of a better-synchronized transmission. The horsepower rating need not increase along with this. Yet another Audi formula: A high-quality car will cost DM 1,400 more if its weight is cut by 25 percent, but it will then consume 2.2 liters less gasoline per 100 km.

The automobiles of this decade are to be lightweight and streamlined, low in horsepower but with good acceleration, more expensive and economical to operate. More diesel-powered passenger vehicles will be driven on our roads; there will be better turbochargers for the average engine; and, finally, electronics will help "completely sweep out the last corners of economy" (Piëch). Piëch has already demonstrated this with the Audi Quattro, the Ingolstadt company's new flagship that costs DM 50,000. The car -- with four-wheel drive (hence the name Quattro), a five-cylinder 2.2-liter engine with turbocharger (200 horsepower), a fully electronic ignition system and other ingenious technical devices -- has a speed of 220 km per hour with an average fuel consumption of a scant 12 liters of premium gasoline /per 100 km/ -- the fastest general-purpose car in the world.

The Audi development chief and his fellow workers are so sure of themselves when it comes to building cars that they are already on the lookout for other fields of activity. Says Piëch: "They ought to give us auto engineers a shot at oil heating. Things would look better there afterwards, too."

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FRANCE

GOVERNMENT'S ENERGY POLICY FOR 1980'S OUTLINED

Paris LA LETTRE DE L'EXPANSION in French 31 Mar 80 pp 4-5

Documentary article: "Energy Policy up to 1990"

Text The next Council of Ministers will draw up the major guidelines of the energy policy up to 1990. It has been prepared on the basis of a work document compiled by the Energy Commission of the Eighth Plan, and the principal conclusions are given below.

The document examines two possible scenarios with regard to the evolution of the price of oil:

--A "pink" scenario based on the assumption of an agreement between producing countries and consumer countries. According to this hypothesis, the price of oil (in terms of 1980 francs and dollars) would increase from the current \$20 per barrel to \$32 in 1985, \$35 in 1990 and \$43 in the year 2000 (or an increase of 2 percent per year).

--A "gray" scenario (no agreement; which appears the more probable to the commission): the price per barrel would reach \$55 in 1990.

Oil at \$55 per Barrel

The commission recommends using this hypothesis as a work basis (in fact, the government seems to be heading in this direction). It insists on the need to give priority to the saving of energy. Although a growth rate of 4 percent in the French economy is desirable (and obtainable in the "pink" scenario), there is little chance that we can reach that goal in the hypothesis of the "gray" scenario; we would then have to be content with a growth rate of about 3 percent per decade.

The balance between the energy demand and supply would turn out to be the following in accordance with the two hypotheses (in millions of tons of equivalent oil):

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	<u>1985</u>		<u>1990</u>	
	<u>gray scenario</u>	<u>pink scenario</u>	<u>gray scenario</u>	<u>pink scenario</u>
A. Energy demand				
1. Trend before 1973	226	240	262	292
2. Savings resulting from energy price hike alone	194	231	225	273
3. Voluntary strengthening of energy savings	182	215	211	243
B. Coverage of demand				
1. Reduction of oil requirements to a minimum (transportation and petrochemistry) in the year 2000	100	100	90	90
2. Remainder to be procured	82 to 94	115 to 131	121 to 135	153 to 183
3. Maximum production of domestic energy:	76 to 79	76 to 79	106 to 111	106 to 111
of which: hydroelectricity	14 to 15	14 to 15	15 to 16	15 to 16
nuclear electricity	43	43	70	70
domestic oil	2 to 3	2 to 3	3 to 5	3 to 5
domestic gas	5	5	5 to 6	5 to 6
renewable energies (wood, solar and the like)	3	3	6	6
domestic coal	9 to 10	9 to 10	7 to 8	7 to 8
4. Remainder to be made up	3 to 18	36 to 55	10 to 29	42 to 77
5. Possible coverage of remainder:				
imported gas	30	30	26 to 40	26 to 40
supplementary nuclear electricity	--	--	3	3
imported coal	20 to 25	20 to 25	30 to 40	30 to 40

According to the commission, the basic goal of the energy policy should be to reduce our share of oil to less than 40 percent of our domestic requirements (compared with 57 percent at present). Therefore, the commission recommends setting a ceiling of 90 million tons of oil to be consumed in France in 1990 compared with 108 million tons actually consumed in 1979 and 160 million tons in 1990, if no effort toward economy were made. The principal savings should be made by EDF [French Electric Power Company] in the use of heavy fuel; for domestic fuel, a reduction in consumption implies sizable investments; in the industrial sector, everything will depend on replacing fuel with gas;

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everywhere, savings will be all the more acute as the price of oil products rises. But the commission insists that "the energy problem is basically one of investment."

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FRANCE

DIRECTORATE FOR CIVIL AERONAUTICS PROGRAMS REVIEWED

Paris AIR & COSMOS in French 9 Feb 80 pp 9-10

[Text] The Directorate for Civil Aeronautics Programs [DPAC] was created on 30 March 1976 when the General Secretariat for Civil Aviation [SGAC] became a general directorate.

It was formed by merging a Subdirectorate for Aeronautical Construction Programs, which had been a part of the former SGAC's Directorate for Air Transport, with the major aeronautics program directorates (Concorde, Airbus, CFM 56), which had reported directly to the secretary general.

The aim was to achieve better functional coherence within the Ministry of Transport, which is responsible for all civil aeronautics construction matters, whether they concern commercial aviation, private aviation, helicopters or light aircraft, or whether they concern airframes, engines, equipment or research.

Article 6 of Decree 76284 of 30 March 1976, which created the DGAC [General Directorate for Civil Aviation], stipulates the functions of the DPAC: "The DPAC prepares detailed civil aeronautics research, design and construction programs, implements them and manages the budgets relative thereto."

The new organization has made it possible to strengthen the liaison between those responsible for major programs and those responsible for the rest of the sector, to render advance-planning activities more coherent, and to more clearly regroup all combinatorial activities, especially the budget and programming.

Prolongation of Successful Activities

In accordance with the government's policy on aeronautical construction, which, based on the existence in place of a modern military aeronautical industry, seeks to develop acquired technologies toward other ends, to assure highly skilled employment, and to improve our foreign trade, the DPAC has as a priority objective the long range prolongation of activities that have already achieved success or are on the verge of doing so.

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Products that have achieved a breakthrough must continually evolve in accordance with technological advances and the needs of the market. Provision must therefore be made for their constant adaptation, to promote the branching out that is indispensable for maximum profitability over the longest period of time. This demands tenacity and follow-through, and the DPAC is determined to provide maximum possible support to those industrialists who, through their own dynamism and ability, have succeeded in capturing a place on the international scene.

In particular, the Airbus and the CFM 56, the two major civil aviation programs, have opened noteworthy long range employment and export prospects.

Everything must be done, therefore, to support these product lines.

The new organizational structure facilitated the decision-making that went into the launching of the A 310 version of the Airbus in 1978, and the establishment of a policy supporting the equipment manufacturers who were able to earn a choice spot in the future of this plane,

New derivatives of the Airbus are already being designed with government aid.

The CFM 56, for its part, has entirely fulfilled the hopes placed in it in the early 1970's, with the decision by many companies to replace the engines in their DC 8's with the CFM 56, and the recent one by the American Air Force to equip their KC 135 supply plane with it.

To extend these successes, progressive improvements to the basic motor are already being planned with a view to maintaining its long-term competitiveness, and a scaled-down derivative of it is already being planned to equip or re-equip planes having seating capacities of 120-130 passengers.

While these two programs, because of their vast potential for spin-offs of all kinds, are being given the highest priority, support of sectors that long ago succeeded is in no way being neglected.

This is the case of private planes, the most recent of which, the Falcon 50, has received significant government support, and of the civilian-helicopter sector, which, because of the preeminent position occupied by our industry, is being diligently safeguarded.

The overall results of this policy, the seeds of which were germinated some 10 years ago and which has since then been nurtured by progressive adoption of the necessary accompanying measures to bring it to fruition, are measurable in terms of its operative impact on our balance of payments.

Thus, civil aeronautical construction, which was in the red in 1975, accounted in 1979, through deliveries made in the course of that year, for a net surplus of more than 2 billion francs in our foreign trade balance--a surplus that will grow to more than 8 billion (1979) francs in 1983.

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Openness to Innovation

To secure the long-term future, the DPAC makes it a standing rule to pursue diligently and without a prioris the prospects opened by new technologies, as well as new projects which may in some cases be based on profound innovations.

To this end, it has facilitated developmental exploration projects (aeronautics, composite-materials structures, and so forth) bridging the crucial gap between research and development properly speaking.

It is providing full support to the exploratory studies being carried out by the SNIAS [National Aerospace Industrial Company] on future planes based on the concepts disclosed by Airbus Industrie and approved by the prime minister at the last Bourget Air Show (narrow-bodied planes seating 130-160 passengers, a larger-scale version of the Airbus, and a long-haul Airbus).

Its aid is not always crowned with success. Thus, it supported the effort deployed around the helicostat [a type of helicopter stabilized by a streamlined balloon] in an attempt to resolve the troublesome problem of unloading timber in zones of difficult access. Although this effort has been discontinued, the studies carried out served to clarify the nature of the difficulties that have to be resolved.

This illustrates the importance of a policy of soundings that can be carried out at low cost levels and that enable the timely phasing out of a program as soon as the requisite studies show that it probably cannot be undertaken with a reasonable chance of success.

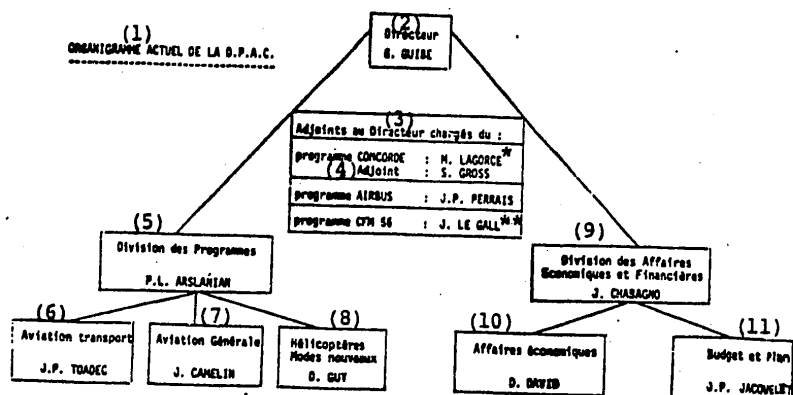
The support currently being provided to the study of a rotary-plug motor, which could bring about a minor revolution in the field of light aviation, is based on an exploratory enterprise of this kind, with no assurance as yet as to its future outcome.

It is from this same standpoint that the DPAC is participating in the technical vigil being maintained by the SNIAS and the SNECMA [National Aviation Engine Design and Construction Company] over the future of supersonic transport, so as not to be caught unawares should an opportunity arise in time, within the framework of an enlarged international cooperation, for a second-generation plane.

The DPAC: A Small Organization Dedicated to Promoting and Synthesizing

To carry out its missions, the DPAC has progressively and intentionally organized itself as a light centralized administrative structure, avoiding duplication of functions, taking into account the existence of structures in other ministerial departments that are already working on aeronautical matters.

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* Mr. Lagorce is also responsible to the director general of civil aviation for environmental problems and for export and foreign operations matters. In the latter function, he is assisted by S. Gross.

** J. le Gall is also responsible to the director of the DGAC for various assignments (bi-CFM 56 planes, large subsonic engines, etc.)

Key:

1. Current DPAC Organization Chart
2. Director
3. Deputy directors for: [programs as shown]
4. Deputy
5. Programs Division
6. Transport Aviation
7. General Aviation
8. Helicopters - New Applications
9. Economic and Financial Affairs
10. Economic Affairs
11. Budget and Plan

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In particular, the Technical Directorate for Aeronautical Construction provides it with invaluable assistance on the technical and industrial aspects of every program or project, as much on the part of the technical and industrial directors assigned to the two major programs (Concorde, Airbus) as on that of the engineers in the technical services (STPA [expansion unknown] and STPE [Technical Service for Propellants and Explosives]), each from the viewpoint of his own specialty.

The DPAC employs, at the moment, in addition to its administrative personnel, a staff of 15 engineers and one administrative officer, the engineer staff being:

--five weapons engineers;

--seven civil aviation engineers;

--three civil aviation operations and design studies engineers.

It is planned to increase the DPAC staff by a few additions to the Programs Division.

The DPAC's budget covers practically nothing beyond capital expenditures totaling around 1.2 billion francs, consisting of over 75 percent of the credits of this type allocated to the DGAC and 12.5 percent of those allocated to the Ministry of Transport (1979).

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FRANCE

BRIEFS

DASSAULT ENERGY PLAN--Based on a public-bridges-and-highways-office engineer's plan, Marcel Dassault has adopted the idea of building a tidal powerplant at Mont-Saint-Michel. Built on an artificial estuary formed by a dike and the west coast of the Cotentin Peninsula, this powerplant would furnish, according to Dassault, as much electricity as 10 nuclear powerplants. [Excerpt] [Paris VALEURS ACTUELLES in French 24 Mar 80 p 64]

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ITALY

FIAT AND PIRELLI PRODUCE FUEL-SAVING TIRE

Milan CORRIERE DELLA SERA in Italian 2 Apr 80 p 21

[Article by Nestor Morosini: "In Order To Save Fuel, FIAT and Pirelli Have Become Allies"]

[Text] FIAT has embarked on a close collaborative effort with Pirelli to manufacture tires that will allow a significant savings in energy. The first tire produced as a result of this joint effort was the P8, the latest to come from the Italian enterprise. It is a radial of the lowered section series. The problem facing all cars is that of finding the correct tire to increase its hold on the road. Engineer Paolo Ramoino, who is responsible for FIAT experimental vehicles, explains: "We asked Pirelli to modify the basic tire model according to the needs that were being discovered during initial tests undertaken on the Ritmo, which at the time of our experiments was our newest car. By pure chance, the P8 was a tire that already was adapted to that particular vehicle."

In addition to limited course tests, FIAT and Pirelli conducted 15,000 kilometers of tests (on mixed surface roads to include highway, provincial and communal roads, some with a high percentage of curves) and the result was a savings in fuel of 15 percent. The objective was to reach a ceiling of 5-6 percent while not detracting from the vehicle's safety measures. Essentially the goal was to reach a given fuel economy without jeopardizing the car's security measures.

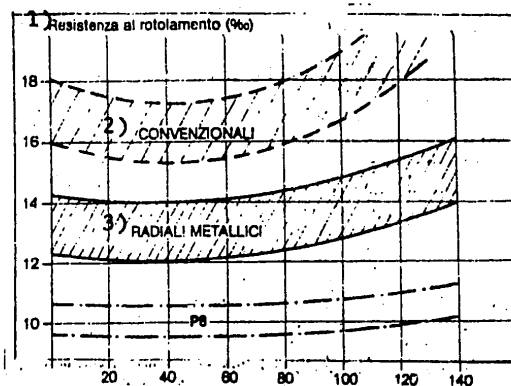
During the second phase of the FIAT-Pirelli collaboration, the main aim was to improve the tire's grip on a wet surface even if this meant a diminishing of fuel economy. "We worked on the tire's materials" explained Ramoino "because the only part that comes in contact with the road surface is the tread. It was necessary to balance the tire's mix: namely to find a compromise between the hard mix for a long tire life and a soft mix for smoothness. After the balance had been attained, we obtained an elastic product that also performed in a positive manner on a wet surface. We attained the solution following a number of tries."

According to technicians of both industrial enterprises, the P8's are better than a normal "SR" radial: on a dry road surface, the Ritmo

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benefited from the form and structure of the 4-inch road "footprint." The P8 was designed as a racing tire, thus benefiting from these positive characteristics. The first deliveries of the first tire produced with the collaboration of FIAT was for the Ritmo of the Targa Oro series. Further deliveries will include tires for the Ritmo Super (which will make its debut shortly and should be a more powerful automobile with better accessories) and finally the tires will be offered as options for the whole line of FIAT cars.



Key:

1. Resistance To Road Travel (%)
2. Conventional
3. Steel belted radials

The graph points out the P8's reduced resistance compared the other types of tires.

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